

# Intersection Analysis Guidelines

## Level-of-Service (LOS) Criteria for Intersections

LOS	Signalized Control Delay (sec/veh)	Unsignalized Control Delay (sec/veh)
A	$\leq 10$	$\leq 10$
B	$> 10$ and $\leq 20$	$> 10$ and $\leq 15$
C	$> 20$ and $\leq 35$	$> 15$ and $\leq 25$
D	$> 35$ and $\leq 55$	$> 25$ and $\leq 35$
E	$> 55$ and $\leq 80$	$> 35$ and $\leq 50$
F	$> 80$	$> 50$

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### Signalized Intersection Default Values

- See Figure 1 for Percent Heavy Vehicles
- Cycle Length

Number of Phases	Minimum Recommended (seconds)
2	60
3	90
4	110
5	110
6	140
8	140

Note: Maximum recommended cycle length is 180-240 seconds.

- Total Lost Time – 5.0 sec/phase for most intersections, and increase clearance as needed for large cross sections such as a single point urban interchanges (SPUI).
- Assume no right turns on red (worst case).
- Consider coordination of traffic signals if spacing between signalized intersections is less than one mile.
- When protected left-turns are used, use protected only phasing not protected / permitted phasing.

- Check for the possibility of using overlapping right-turn lanes where appropriate.
- See *Highway Capacity Manual 2000*, Exhibit 10-12 for guidance with other default values.

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### Left Turn Treatment

Use protected left turn treatment (not protected/permitted) when (a) dual left turn lanes are present or (b) when a condition is satisfied in the table below:

Number of Opposing Lanes (Through and Right)	Condition
1	Left Turn Volume*Opposing Volume > 50,000
2	Left Turn Volume*Opposing Volume > 90,000
3 or more	Left Turn Volume*Opposing Volume > 110,000

Consider dual left turn lanes when left turn volume approaches 300 vehicles per hour.  
(Reference HCM 2000, page

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### Right Turn Treatment

Consider an exclusive right turn lane when right turn volume approaches 300 vehicles per hour and the mainline volume exceeds 300 veh/hr/ln. (Reference: HCM 2000, page 10-18)

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NOTE: Provide justification for using values other than the default values.

## Figure 1 - Peak Hour Truck Percentages

Heavy vehicle (truck) percentages provided with projected traffic volumes are usually given as a percentage of the total average daily traffic (ADT). The peak hour truck percentage is expected to be somewhat less than the ADT truck percentage because of the increase in the number of passenger cars during the peak hour and truck schedules which favor off peak travel periods. Based on discussions with J. N. Springer of the Traffic Forecasting Unit, the appropriate total truck percentage for peak hour analysis is calculated by adding the ADT Dual/Single Unit (SU) truck percentage to the ADT TTST/Combination Vehicle (CV) truck percentage and dividing the total by two. However, some of the capacity analysis packages/methods allow the entry of the different types of trucks separately. In these cases, the Duals and TTST truck percentages should each be divided by two and entered appropriately. On the rare occasion when the truck percentages for the actual peak hours are provided with a specific traffic forecast, the truck percentages can be used directly without dividing them by two.

The following is an example of the traffic projection format currently used. Add the SU and the CV and divide by 2:

$(3+2)/2=2.5$ , round up to 3% trucks

